



**דנה ויינר, דיאטנית**  
**מנהלת היחידה לתזונה ודיאטה**  
טלפון : 03-5303218  
נייד : 052-6666840 , 050-2065769  
מייל : Dana.weiner@sheba.health.gov.il

## התרד של המאה ה-21 - 21<sup>st</sup> century's' spinach

### דנה ויינר

The metabolic roles of mitochondria go far beyond serving exclusively as the major producer of ATP in tissues and cells. Evidence has shown that mitochondria may function as a key regulator of skeletal muscle fiber types and overall well-being. Maintaining skeletal muscle mitochondrial content and function is important for sustaining health throughout the lifespan. Of great importance,  $\beta$ -hydroxy- $\beta$ -methylbutyrate (HMB, a metabolite of l-leucine) has been proposed to enhance the protein deposition and efficiency of mitochondrial biogenesis in skeletal muscle, as well as muscle strength in both exercise and clinical settings. Specifically, dietary supplementation with HMB increases the gene expression of peroxisome proliferator-activated receptor gamma co-activator 1-alpha (PGC-1 $\alpha$ ), which represents an upstream inducer of genes of mitochondrial metabolism, coordinates the expression of both nuclear- and mitochondrion-encoded genes in mitochondrial biogenesis. Additionally, PGC-1 $\alpha$  plays a key role in the transformation of skeletal muscle fiber type, leading to a shift toward type I muscle fibers that are rich in mitochondria and have a high capacity for oxidative metabolism. As a nitrogen-free metabolite, HMB holds great promise to improve skeletal muscle mass and function, as well as whole-body health and well-being of humans.